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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|-----------------------------|------------------------|
| 10/530,733 | 02/21/2006 | Stefano Barbieri | M0025.0325/P325 | 2090 |
| 24998 | 7590 | 10/27/2008 | | |
| DICKSTEIN SHAPIRO LLP 1825 EYE STREET NW Washington, DC 20006-5403 | | | EXAMINER GOLUB, MARCIA A | |
| | | | ART UNIT 2828 | PAPER NUMBER |
| | | | MAIL DATE 10/27/2008 | DELIVERY MODE PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|--|--|
| Office Action Summary | Application No. 10/530,733 | Applicant(s) BARBIERI ET AL. | |
| | Examiner MARCIA A. GOLUB | Art Unit 2828 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 September 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) 5,6,13 and 14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 7-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to claim 1 have been considered but are moot in view of new matter limitations in the amended independent claim.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1 - 4 and 7-12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 1 recites a range of 100 GHz-20 THz, the applicant does not have support for this range. The description of the elected embodiment discloses a laser with an output of 4.4 THz.

Claim 4 recites a range of 20 GHz-10 THz, the applicant does not have support for this range. The description of the elected embodiment discloses a laser with an output of 4.4 THz.

The first paragraph of applicant's disclosure describes that a colloquial definition of TeraHertz frequency range implies a range between 25 GHz-100 THz and especially between 100 GHz-20 THz. This disclosure cannot be relied upon for support since it is related to nomenclature used in the prior art and is not part of applicant's description of their invention.

Claim 4 originally recited a range of 20 GHz – 100 THz, and is considered to be part of the original disclosure. However, the range presented in this claim cannot be narrowed down to get around the prior art reference without proper support in the specification.

Claim Objections

Claim 4 objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The claim recites a range that is broader than the range presented in the independent claim 1. Specifically, 20 GHz-10 THz is outside the lower limits of the 100GHz-20THz.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-4 and 7-12 are rejected under 35 U.S.C. 102(e) as being anticipated by Hwang (6,560,259) hereinafter '259.

Figs. 1 and 5 of '259 disclose a laser comprising:

1. "a substrate comprising a bulk region [101, 108, 131, 502] and a conducting layer [109, 104];

an active region [105] comprising a quantum cascade structure provided on a first surface of the substrate such that said active region is electrically connected to said conducting layer [109, 104];

first and second contacts [122, 124, 511] provided to said conducting layer such that said first and second contacts are electrically connected to said active region, said first and second contacts being disposed on opposite sides of said active region;

and an active region contact provided to said active region such that a potential [510] may be applied between said active region contact and said first and second contacts to cause said active region to lase.

2. “wherein the conducting layer [109] comprises a highly doped semiconductor.”
($1 \times 10^{19} \text{ cm}^{-3}$)
3. “wherein the conducting layer is thin enough [20 nm], such that in operation, the two surface plasmons present at the two interfaces of the conducting layer merge into a single mode.” Structure implies function, see MPEP 2112.01.
4. “ wherein the cascade laser is configured to emit photons having a frequency in the range from 0.02 THz to 100 THz.” No actual structure is recited that would differentiate the invention from the prior art in configuring it to emit in THz range.
9. “wherein said first and second contacts [122, 511] are symmetric about said active region.
- 7,8. “wherein the resistance between the first and active region contacts or second and active region contacts is less than twice the resistance of the active region.” No actual structure is recited that would differentiate the invention from the prior art in making the resistance between the contacts less than twice the resistance of the active layer. Also, it is not clear at what operational voltage/current the resistance is measured.
10. “wherein the dielectric constant of the conducting layer [109] is negative relative to the dielectric constant of the surrounding layers [133].” The dielectric constant of metals and highly doped semiconductors is negative, while the dielectric constant of insulators is positive.
11. “wherein the active region [105] comprises a strip waveguide.”
12. “wherein the active region comprises a lamination of layers [InAlAs/InGaAs] having at least two different band gaps.”

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact Info

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARCIA A. GOLUB whose telephone number is (571)272-8602. The examiner can normally be reached on M-Th 9:30-6 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on 571-272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Marcia A. Golub-Miller/

/Minsun Harvey/

Supervisory Patent Examiner, Art Unit 2828